APPENDIX 6 – WASTE MANAGEMENT OPTION ASSESSMENT

6.1 INTRODUCTION

To ensure a consistent approach in assessing the strategic waste management options for the Region an appraisal methodology has been used based on the approach recommended by the Welsh Assembly Government in their Waste Strategy for Wales. The five principal stages of this methodology can be summarised as follows:

- Establishing sustainability objectives and indicators (Step 1 of the assessment process)
- Identifying overall performance scores for each sustainability indicator (Step 3 of the assessment process).
- Establishing a valued performance score for each sustainability indicator (Step 4 of the assessment process)
- Applying a weighting to each sustainability indicator to generate a final score (Steps 5 & 6 of the assessment process)
- Undertaking a sensitivity analysis of the results (Step 7 of the assessment process)

The performance of each Option, using the above methodology will be assessed in the second stage report with the aim of identifying a preferred waste strategy option for Gwynedd both in terms of the BPEO and SWMO.

Performance scores for each option have been developed from two main sources:

- Life Cycle Assessment (LCA), using the Environment Agency WISARD software to generate environmental impacts. A description of LCA methodology and the WISARD software is provided in Chapter 2 of this appendix.
- Professional judgement based on experience within the UK, rest of Europe and elsewhere.

6.2 LCA MODELLING & WISARD SOFTWARE

A life cycle assessment (LCA) approach has been applied, using the Environment Agency WISARD software, to provide an assessment of waste management options for the Year 2010.

LCA is defined in ISO 14040 (Final Draft International Standard) as *'the compilation and evaluation of the inputs and outputs and the potential environmental impacts of a product system throughout its life cycle*[2]. A simple flow diagram is shown in Figure A6.1 that summarises the basic principles of the LCA approach.

[2] ISO 14040 – LCA: Principles and Framework. Also refer to ISO 14041 – LCA: Inventory Assessment, ISO 14042 – LCA: Impact Assessment, and, 14043 – LCA: Interpretation.

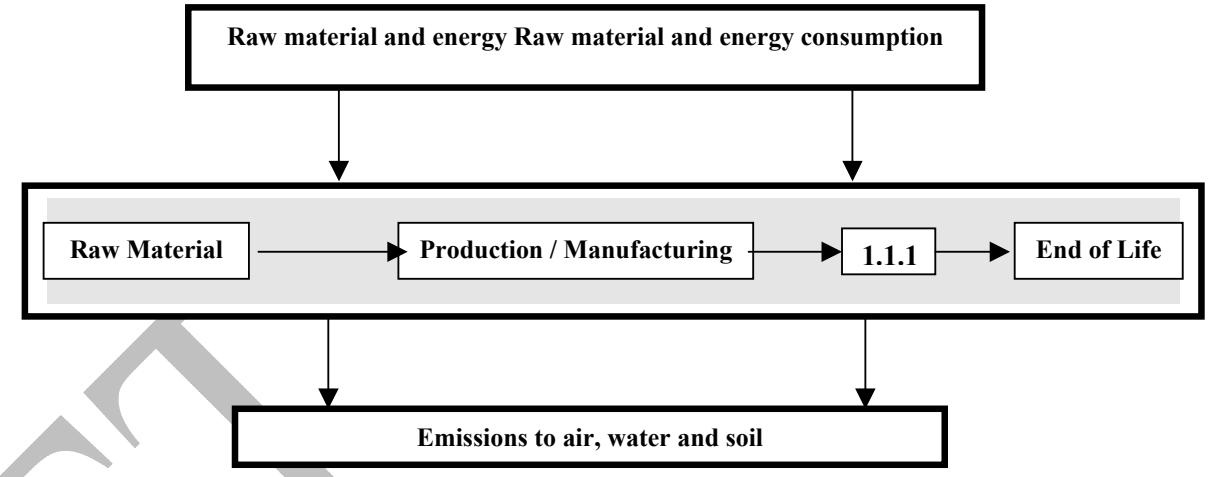

Figure A6.1: LCA approach.

The versatility of the LCA approach has led to an increase in its application by both industry and governments throughout the world. At a European level, the LCA approach has been used extensively as a tool for informing policy development, such as the EU regulations on eco-labelling. Another example of its promotion is in the European Directive on Packaging and Packaging Waste (94/62) which states that *'life cycle assessments should be completed as soon as possible to justify a clear hierarchy between re-usable, recyclable and recoverable packaging*[3].

In the UK, studies incorporating LCA have been conducted for the DETR on end-of-life vehicles, and, waste electrical and electronic equipment. In Wise About Waste [3] LCA is cited as a useful tool in determining the Best Practical Environmental Option. Within the same document specific reference is made to the EA WISARD life cycle software.

It should be noted however, that LCA is rarely a precise science and that its application should be in conjunction with, rather than instead of, other policy forming strategies.

WISARD Software

The EA launched their WISARD LCA tool in 1999 with the aim of providing an objective mechanism to assist in decision making for waste managers and planners in regard to managing non-inert municipal waste. This has required the inert waste streams (C&I and C&D) to be modelled as glass reflecting a generally inert waste stream.

The program considers all stages in the management and processing of waste from a community for a period of one year, from the household front door through to the controlled disposal or recovery of the waste. Using WISARD, a comparative study of differing waste management services can be made at a community, sub-region, or regional level.

[3] European Directive 94/62/EC on Packaging and Packaging Waste – OJ No L 365. 31/12/94.
[4] Wise About Waste June 2002 (Annex 16) and TAN 21 November 2001 Annex H

The scope of the WISARD program and the various stages included in the analysis of the system is illustrated in Figure A6.2, below.

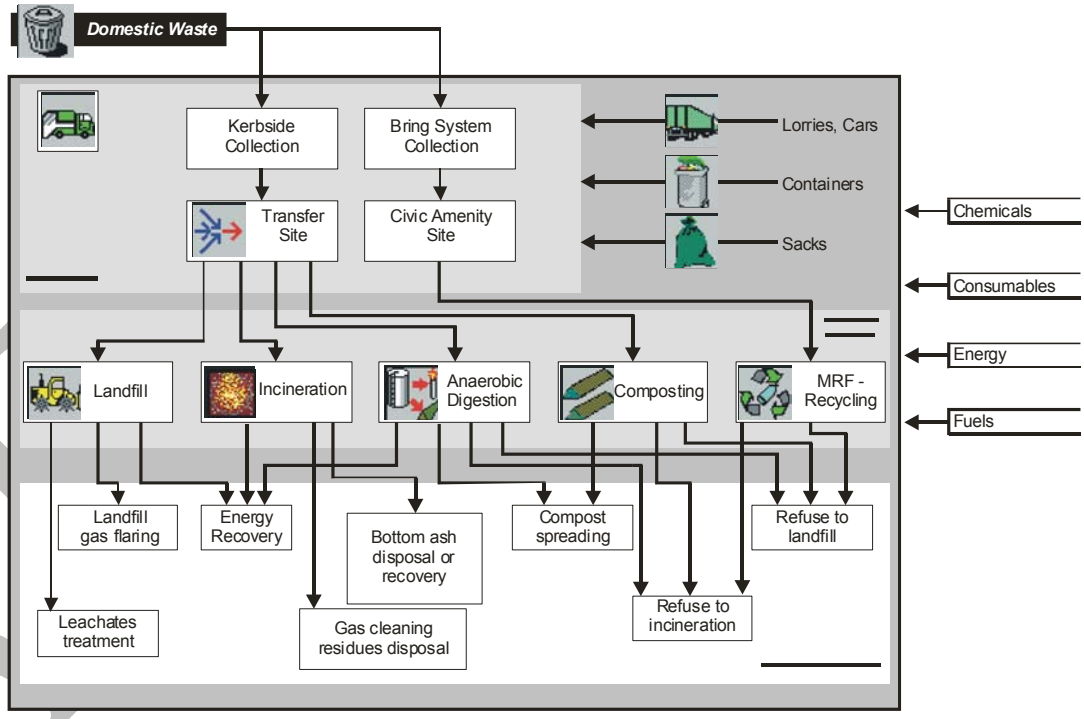

Figure A6.2: Scope of WISARD tool.

The EA have claimed that the software is consistent with the demands of government policy in identifying BPEO and BAT for waste management options. WISARD has also been developed following the ISO series of standards discussed in the above section[2].

The EA have stated their intention to upgrade the current version of WISARD 3.3 in the near future to include additional features such as a financial assessment function, gasification and pyrolysis database options, and, improving the user interface features.

6.3 CHOICE OF SUSTAINABILITY OBJECTIVES AND EVALUATION CRITERIA

Guidance within the Waste Strategy for Wales has been used to identify the sustainability objectives and criteria against which all options are to be measured (Step 1 of the assessment process), a summary of which is given in Table A6.1. The sustainability objectives and indicators established broadly divide into four categories; environmental criteria, socio-economic criteria, operational criteria and waste management policy criteria.

Table A6.1 includes a number of sustainability criteria previously not associated with BPEO determination, for example employment opportunities, noise, local transport impacts and the conservation of landscapes and townscapes. These (and other) criteria identify the sustainability

of each option and therefore when added to the BPEO criteria serve to identify the SWMO, the sustainable waste management option, as defined within the Wales Waste Strategy. The criteria used to determine the SWMO and BPEO are summarised within Table A6.1. In summary however, BPEO determination uses all criteria measured by WISARD, together with deliverability, cost and conforming with waste policy. Evaluation of the SWMO and BPEO is made later in this report (see Section 9).

A brief review of each sustainability objective follows. At this stage each sustainability indicator should be regarded as having equal importance. The application of weighting to each indicator is discussed in Section 10 of this Appendix.

6.4 ENVIRONMENTAL RELATED CRITERIA

6.4.1 To Ensure Prudent Use of Land and Other Resources

A key sustainable development objective is to use finite natural resources (such as fossil fuels and land) more efficiently. Producing more with less, for example by reusing or recycling waste, reduces the environmental pollution and degradation caused by extraction, use and disposal of natural resources.

The choice of waste management option can have a significant influence on the consumption of finite natural resources. For example, an option involving reuse and recovery of materials should result in a reduction in the consumption of primary raw materials. Non-renewable resource depletion is assessed for all Options using the WISARD life cycle assessment tool, and is summarised in Table A6.2a (performance scores) and Table A6.2b (valued scores).

Land is also a finite resource, and the emphasis of government policy is to `recycle' the use of land and buildings through brownfield site development and re-use of buildings. Some waste management options are more `land hungry' than others. Landtake is measured using professional judgement based on the typical size of different facilities. An estimate of landtake (in hectares) for each facility type is given in Table A6.3a. A summary of the potential 'total landtake' for all Options is given in Table A6.3b, indicating landtake ranging from 15 – 23ha

Renewable resource depletion is used for determination of both the BPEO and SWMO, whereas landtake is used in determination of the SWMO only.

6.4.2 To Reduce Greenhouse Gas Emissions

Global climate change is widely recognised as one of the greatest environmental challenges facing the world today. The clear message from the scientific community is that climate change is due, at least in part, to the increasing concentrations of greenhouse gases in the atmosphere.

A number of waste management operations give rise directly or indirectly to emissions of greenhouse gases. The decomposition of waste in landfill sites also gives rise to methane (CH_4), which is around 20 times more potent a greenhouse gas as CO_2. A key objective of the Landfill Directive is to reduce our reliance on landfill and to thereby cut methane emissions. Measurement

of this sustainability objective is made through assessing greenhouse gas emissions for all Options using the WISARD life cycle assessment tool, and is summarised in Table A6.2a (Performance Scores) and Table A6.2b (Valued Scores)

Greenhouse gas emissions are used for determination of both the BPEO and SWMO.

6.4.3 To Minimise Adverse Impacts on Air Quality and Public Health

A key sustainable development objective is to control air pollution in order to reduce the risks to human health, the natural environment and quality of life. Pollutants of most concern to Government include: Nitrogen Dioxide; Sulphur Dioxide; Carbon Monoxide; particles (PM10); and Ozone. Measurement of these indicators is made for all Options using the WISARD life cycle assessment tool, and summarised in Table A6.2a (Performance Scores) and Table A6.2b (Valued Scores) for the following impact assessment categories; human toxicity, air acidification and ozone depletion.

Dust is defined as small particles in the range 1-75 microns in diameter. Small particles of dust (PM10) are injurious to public health. Measurement of this indicator has been made using Human Toxicity, one of the impact assessment categories within WISARD (see Table A6.2a (Performance Scores) and Table A6.2b (for Valued Scores).

However, it is the soiling of property that is the most common cause of complaint. A range of waste management processes potentially give rise to dust, particularly where mechanical operations and storage of waste take place in the open. Vehicle movements can also be a significant dust generator, both on and off site. Professional judgement based on experience of existing facilities is used to measure (on a nominal scale) dust generation for each facility type, as shown in Table A6.4a, indicating that large landfills are over 60 times more likely to have an adverse dust impact than transfer stations. A summary of performance scores for dust for each option is given in Table A6.4b, indicating Option 0 scores worst and Option 6 score best.

Odour is a common cause of public concern in relation to waste management. Like dust, odours can be particularly acute where mechanical operations and storage of waste take place in the open. Odours are difficult and expensive to abate. Measurement of this indicator is made using professional judgement based on experience of existing facilities. A qualitative scoring allocation for each facility type is given in Table A6.4a.

A summary of the total ‘dust and odour’ scores for Options 0 to 6 is given in Table A6.4b, indicating Option 0 scores worst and Option 6 scores best.

Air acidification, human toxicity and ozone depletion are used for determination of both the BPEO and SWMO, whereas odour and dust are used in determination of the SWMO only.

6.4.4 To Conserve Landscapes and Townscapes

Landscapes and townscapes have strong economic, social and community value. All waste management options involve development components such as buildings, processing plant,

access roads, lighting/signage, storage mounds and perimeter bunds. These can have landscape impacts (effects on the general landscape character and quality of the surrounding area) and visual impacts (including changes in available views, the effect of those changes on people and the overall impact on visual amenity). Whilst the extent of landscape and visual impacts is strongly influenced by the nature of the receiving environment, concern is likely to be greatest where options involve emissions stacks, large enclosed facilities or significant storage/disposal of waste above ground level.

In this report measurement of this sustainability objective is made using professional judgement based on the typical nature, size and number of facilities proposed for each of the options considered. A qualitative scoring allocation for each facility type is given in Table A6.5a, suggesting landfills have a far greater impact than any other facility type. A summary of the total 'landscape impact' scores for all Options is given in Table A6.5b, indicating Option 6 scores best and Option 0 scores worst.

This criterion is used for determination of the SWMO only and does not form part of the BPEO assessment.

6.4.5 To Protect Local Amenity

Living and working environments make an important contribution to 'quality of life.' In addition to attractive streets and buildings, access to green spaces, and community safety, low levels of noise and litter are also important considerations. All waste management options generate noise and litter, as they involve the storage, treatment and transport of waste. However, litter is most likely to be of concern where the waste is stored or processed/ deposited in the open. Noise is most likely to be of concern in relation to sites that operate outside standard working hours, or use particularly noisy unenclosed plant (e.g. screening/ crushing machinery).

In this report measurement of this sustainability objective is made using professional judgement based on the current performance of existing facilities proposed for each of the options considered. For 'noise impacts' a qualitative scoring allocation for each facility type is given in Table A6.6a, suggesting EfW and MBT facilities score noticeably worse than composting. A summary of the total 'noise impact' scores for all Options is given in Table A6.6b, indicating Option 0 score best and Option 5 scores worst. For 'litter impact' a qualitative scoring allocation for each facility type is assumed to be the same for dust and odour impacts and therefore summarised in Table A6.4a. A summary of the total 'litter impact' scores for all Options is given in Table A6.4b, indicating Option 0 scores worst and Option 6 scores best.

These criteria are used for determination of the SWMO only and do not form part of the BPEO assessment.

6.5.6 To Minimise Adverse Effects on Water Quality

All waste management options will create potential impacts on water as they involve the following:

- The storage of waste (e.g. run off from rain and dust suppression sprays, leaching of contaminants)
- The transport of waste (e.g. run off from the delivery and tipping of materials, wheel washing)
- The operation of plant and vehicles (e.g. potential pollution from oil and solvents, including the risk of accidental spillage).
- However, some waste management options present a greater risk to water quality than others, for example:

    - Composting: Water is generated as part of the process and the compost has to be turned and wetted. The liquor generated from this process may contain heavy metals and other contaminants.
    - Anaerobic digestion: The process results in a digestate liquor which may contain high levels of metals and other contaminants.
    - Incineration: Cooling and cleaning water may contain high levels of contaminants, whilst the storage and disposal of ash and air pollution control residues poses a further threat to water quality.
    - Landfill/landraising: The risk of pollution depends on the characteristics of the wastes, the standard of site engineering, the underlying geology and the proximity of water courses and abstraction points. The Environment Agency's advice is that, however well engineered a landfill site, there is a risk of leachate release to the water environment.

In this report WISARD has been used to quantify water eutrophication as a measure of water contamination and is summarised in Table A6.2a (for Performance Scores) and Table A6.2b (for Valued Scores). Professional judgement has also been used to determine the current performance of existing facilities. A qualitative scoring allocation for each facility type is given in Table A6.7a, suggesting the adverse impact of landfill is far greater than for all other facility types. A summary of the potential 'water contamination impact' scores for Options 0 to 6 is given in Table A6.7b, indicating Option 0 score worst and Option 6 scores best.

Eutrophication of water is used for determination of both the BPEO and SWMO, whereas potential for water contamination is used in determination of the SWMO only.

6.5 SOCIO ECONOMIC RELATED INDICATORS

6.5.1 To Minimise Local Transport Impacts

An efficient transport system is needed to support a strong and prosperous economy and to maintain and improve people's quality of life. However, congestion and unreliability of journeys add to the costs of business, and undermine competitiveness. Major traffic arteries cause 'severance' within a community when people become separated from places and other people and 'fear and intimidation' amongst pedestrians. Heavy levels of traffic also damage towns and cities, and harms the countryside.

All waste management options have local transport impacts as they involve some degree of off-site movement of waste. The scale of impacts will be influenced by factors such as vehicle size, frequency of vehicle movements, road/pavement width, and traffic speeds. The scope to mitigate or avoid impacts (e.g. by avoiding sensitive receptors, restricting hours of operation and 'backloading' vehicles) is also important.

Measurement of this sustainability objective uses total waste kilometres travelled for each option. This information[4] is estimated for input data to the WISARD modelling undertaken to measure environmental objectives such as air quality, water quality and resource depletion. A summary for all Options is given in Table A6.8, indicating that the greatest distances travelled are for Option 5 and the least travelled in Option 0.

This criterion is used for determination of the SWMO only and therefore is excluded from the BPEO assessment.

6.5.2 To Provide Employment Opportunities

A high employment rate is one of the key objectives of sustainable development. It is considered that employment enables people to meet their needs and improve their living standards, and thereby to help tackle poverty and social exclusion.

Development of new waste management facilities will create temporary construction employment, which may be available to local people, and their long-term operation will create jobs, the nature of which will depend on the facility.

Professional judgement based on experience of job creation at existing facilities is made to measure this sustainability objective. A qualitative scoring allocation for each facility type is given in Table A6.9a, suggesting facilities employing greater than 10 staff include all MBT, most EfW and some MRFs. A summary of the 'total jobs' estimated for all Options is given in Table A6.9b, indicating Option 6 creates the most opportunity for jobs with Option 0 the least number of jobs created.

This criterion is used for determination of the SWMO only and therefore is excluded from the BPEO assessment.

6.5.3 To Provide Opportunities for Public Involvement and Education

Public participation is at the heart of sustainable development. Indeed, the notion of '*thinking globally, acting locally'* underpins the Local Agenda 21 process.

[4] Obtained from Department for Transport, road traffic figures.

In this context it is important for Government, locally and regionally, to *'send the right signals'* to the public in order to encourage changes in behaviour and lifestyles.

Measurement of this sustainability objective is made using professional judgement based on experience of existing facilities and the extent to which they are likely to provide opportunities for positive public involvement. A qualitative scoring allocation for each facility type is given in Table A6.10a, suggesting the facilities with least opportunity include landfill, transfer stations, EfW and AD. A summary of the potential 'public involvement' scores for all Options is given in Table A6.10b, indicating Option 0 scores worst and Option 1 scores best.

This criterion is used for determination of the SWMO only and therefore is excluded from the BPEO assessment.

6.6 OPERATIONAL RELATED INDICATORS

6.6.1 To Minimise the Costs of Waste Management

Costs are clearly a key concern for local authorities, waste contractors and the general public and can have a significant impact in determining the nature of waste management to be developed. The principal costs relate to waste collection and waste treatment/disposal.

Professional judgement based on experience of waste management costs is made to measure this sustainability indicator. Unit costs and their derivation are provided for each waste treatment, disposal and transfer route and are generally based on current costs as at 2003. The exception to this is landfill tax which has been assumed to increase to £35/t by 2010, the assessment year. Operational costs at landfills are also assumed to rise to £35/t by the year 2010 to ensure compliance with the Landfill Directive requirements. Unit costs assumed within this assessment are summarised within A6.11a.

This criterion is used for determination of both the BPEO and SWMO.

6.6.2 To Ensure Reliability of Delivery

Although a waste management option may perform well against a range of indicators, it may not be possible to implement the option due to practical constraints. Such constraints may include:

- Availability of financial resources
- Technological issues, related to the availability of the appropriate plant and machinery
- Difficulties in obtaining planning consents

These constraints are extremely difficult to predict. Nonetheless, measurement of this objective in this report is made using a qualitative assessment based on planning likelihood, hours of operation, and perceived adverse environmental and health impacts. A qualitative scoring

allocation for each facility type is given in Table A6.12a, suggesting EfW facilities are least likely to be deliverable. A summary of the total 'deliverability' scores for Options 0 to 6 is given in Table A6.12b, indicating Option 5/6 are the least likely to be delivered.

This criterion is used for determination of both the BPEO and SWMO.

6.7 WASTE MANAGEMENT POLICY RELATED INDICATORS

6.7.1 To Conform with Waste Policy

The Welsh Assembly Government actively promotes the waste hierarchy, including (in the following order of preference) waste reduction, re-use, recycling and composting, energy recovery, with disposal as a last resort. The Government also wishes to see waste managed in line with the proximity principle which states that waste should generally be disposed of as near to its source as possible. This is in part to ensure that waste problems are not simply exported to other regions or countries, and also recognises that the transportation of wastes can have significant environmental impacts.

The principal aim of this waste strategy process is to conform with local, national and European waste policy. A range of statutory and non statutory targets have been used to develop the options described earlier in this report.

Measurement of this sustainability objective is through assessment of the percentage landfill and recovery achieved for each option considered. A summary of performance for each option is summarised in Table A6.13, indicating the highest recycling/composting is achieved through Option 6 and the highest landfill requirement is needed for Option 0.

This criterion is used for determination of both the BPEO and SWMO.

6.7.2 Closure

The evaluation criteria discussed in this section represents a comprehensive sustainability and environmental appraisal framework for assessment of all Options. Wherever possible, the performance of each option against the above criteria is quantified, for example through the use of the Environment Agency's WISARD life cycle assessment tool. Where this is not possible a qualitative assessment of performance is made.

Clear distinction between those criteria used to determine the SWMO only and those criteria used to determine both the BPEO and SWMO is made following guidance from the Welsh Assembly Government.

The next section of this report presents an overview of the performance of all Options using the evaluation criteria summarised above.

6.8 PERFORMANCE OF OPTIONS

6.8.1 Overall Performance Scores

The purpose of appraising the performance of Options 0 to 6 against the objectives and indicators summarised in Section 8 is to inform decision makers about their relative advantages and disadvantages. The appraisal undertaken in this report is systematic in scoring each option against each indicator. The overall performance scores for Options 0 to 6 are presented in Table A6.14.

Analysis of Table A6.14 is difficult because of the matrix's complexity and the use of different units for each sustainability criterion. Establishing 'valued' performance scores provides a solution to this problem and is discussed in the next section.

6.8.2 Valued Performance Scores

'Valued' performance scores interpret overall performance scores on a scale of 0 to 1, where 0 is the worst performance, and 1 the best. This enables the discrepancy between scores to be retained, whilst allowing the performance of options against all criteria to be placed on a common scale. In this report it is assumed that a linear relationship exists between the best and worst 'value' scores. This approach is used to apply a linear function relationship to the performance scores and the resulting 'valued' performance scores are summarised in Table A6.15.

Table A6.15 indicates that should each evaluation criteria be given equal weighting the better scoring option for all criteria (SWMO analysis) is Option 1, followed by Option 6. Consideration of environmental indicators only (BPEO analysis) gives a slightly different position, with Option 6 and 5 performing best.

6.9 WEIGHTING OF SUSTAINABILITY INDICATORS

It is unlikely that each assessment criterion is of equal significance. It is therefore necessary to apply extra weight to those criteria of greater importance. At present there is no national guidance on the relative significance of each performance criteria (although the Welsh Assembly Government has contributed to the TAN 21 consultation process).

A consultation exercise has been undertaken within Gwynedd, including officers, elected Members and other invited stakeholders. A summary of these responses is given in Table A6.16.

One group not represented within the weightings exercise is the general public due to time constraints imposed by the strategy preparation process. It should be recognised however, that an extensive consultation process is planned for the Municipal Waste Strategy.

Table A6.16 identifies the top two most important criteria identified (through the consultation process) in determining the sustainability of a waste management option are the waste policy objective of percentage recycling and composting and to ensure the prudent use of land and other resources. The weighted 'valued performance' scores for Options 0 to 6 are summarised in Table A6.17 for both the SWMO and BPEO.

Table A6.17 indicates that after weighting of each evaluation criteria according to relative importance Option 6, followed by Option 5 is the preferred choice for both the SWMO and the BPEO. The worst performing option is Option 0 for both the SWMO and the BPEO.

6.10 SENSITIVITY ANALYSIS

The adopted approach for identifying the SWMO ensures that a number of significant indicators are addressed explicitly in arriving at a choice of option. However, the process has inherent uncertainties, associated with the choice of options, the chosen indicators and the weights derived for the indicators. To examine the robustness of the overall results, an examination of their sensitivity to these uncertainties should be undertaken.

Sensitivity analysis can be carried out in one of three ways:

1. ***Alter the way waste is dealt with by considering additional strategic waste options.*** The seven options for consideration in this study were agreed at an earlier stage, and for this reason this study has not considered additional waste management options.

2. ***Addition or subtraction of indicators.*** The range of indicators to be used in the study was agreed at an earlier stage of the process and for this reason additional indicators have not been considered. However it is possible to subtract indicators, and this has been carried out by applying BPEO indicators only; namely environmental indicators, cost and recycling/landfill performance. The results from application of BPEO indicators only have been discussed in the previous section.

3. ***Change weightings applied to each indicator.*** This has been carried out by applying weightings obtained from the Isle of Anglesey and North Wales Regional Waste Plan to the valued performance scores. The results of this analysis are discussed below.

Table A6.18 and A6.19 provides inverted weightings for each of the indicators and these have then been applied to the valued performance scores (Table A6.15). Table A6.20 indicates that after weighting of each criteria using the Isle of Anglesey and North Wales Regional Waste Plan weightings as a comparison, Option 6 is the preferred waste management option for the SWMO, followed by Options 5 and 1. Option 6 also scores most highly for the BPEO using both sets of weightings, with Option 5 following closely. The worst performing option is still Option 0 for both the BPEO and SWMO.

6.11 WHAT IS THE BPEO?

By adopting the methodology described in this Appendix it is possible to compare different options against a number of different assessment criteria. This sustainability assessment has considered 7 options for management of waste in 2010 (assessment year), these being:

Option 0: Baseline Recycling and composting levels (2002/03 performance) with Residual to Landfill

Option 1: Minimum Recycling/Composting to achieve WAG targets with all Residuals to In-vessel composting

Option 2: Minimum Recycling/Composting to achieve WAG targets with sufficient residuals to In-vessel composting to meet Landfill Directive

Option 3: Minimum Recycling/Composting to achieve WAG targets with all biodegradable residuals to Anaerobic Digestion

Option 4: Minimum Recycling/Composting to achieve WAG targets with sufficient biodegradable residuals to Anaerobic Digestion to meet Landfill Directive

Option 5: Minimum Recycling/Composting to achieve WAG targets with all residuals to MBT

Option 6: Exceed Recycling/Composting WAG targets with all residuals to MBT

The overall ranking of all options is indicated in Table A6.21, which shows that Option 6 and Option 5 are the preferred strategy options for Gwynedd.

Option 6 represents a situation whereby existing WAG recycling and composting targets are exceeded with the remainder of waste sent to MBT.

Option 5 represents a situation whereby existing WAG recycling and composting targets are met with the remainder of waste sent to MBT.

6.12 WHAT IS THE PREFERRED OPTION FOR GWYNEDD?

Whilst Option 5 and Option 6 are identified as the Best Practicable Environmental Option and Sustainable Waste Management Option, for a number of reasons external to the BPEO/SWMO analysis it is not felt at the present time, that these generic options provide the most appropriate way forward for Gwynedd.

The main concern with both Options is the ability to deliver a Regional residual waste treatment facility. Whilst MBT has been identified as a preferred Option through the Regional TAN21 process, as yet no site has been identified for the location of such a facility. It is noted that a MBT facility is proposed for Wrexham however the logistics and costs of transporting waste over such a distance, particularly given the rural nature and size of Gwynedd, is likely to prove prohibitive.

In addition, Option 6 assumes an enhanced level of source segregated recycling and composting (overall recycling and composting rate of 50%). Whilst this may be achievable, the costs and logistics of achieving this diversion rate will be onerous and are not deemed to deliver Best Value for waste management.

It is noted elsewhere in this document that Gwynedd own two Dano Drums (one currently operational and the other mothballed) for pre-treatment of residual waste prior to landfill. These two units, with addition of supplementary waste handling, recycling and treatment equipment, could form the basis of a long term residual waste treatment technology for Gwynedd. The existence of two such units, located remotely from each other would suit the rural nature of Gwynedd, where transportation of waste over long distances can be costly and logistically difficult. In light of this, it is felt that Option 1 forms a more realistic long term strategic option for Gwynedd. Option 1 performs consistently well in the BPEO and SWMO assessment (see Table 7.2) and can thus be considered as an appropriate sustainable waste management option for Gwynedd.

Option 1 aspires to a combined recycling and composting rate of 40% by 2009, in line with national targets. Thereafter, additional waste through recycling and composting is achieved through one or two residual treatment facilities, assumed to be a modified and enhanced DANO drum technology. The DANO drums will generate a low quality biostabilised product, that through further treatment and processing will be suitable for agricultural / forestry use within Gwynedd. There is currently uncertainty about the quality of compost derived for mixed waste treatment processes and thus the level of beneficial uses that can be achieved. However, successful composting and beneficial utilisation of mixed waste derived material is achieved elsewhere in Europe, and there is no reason to think that this cannot also occur in the UK in the future.

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[2] ISO 14040 – LCA: Principles and Framework. Also refer to ISO 14041 – LCA: Inventory Assessment, ISO 14042 – LCA: Impact Assessment, and, 14043 – LCA: Interpretation.
[3] European Directive 94/62/EC on Packaging and Packaging Waste – OJ No L 365. 31/12/94.
[4] Wise About Waste June 2002 (Annex 16) and TAN 21 November 2001 Annex H
[6] Obtained from Department for Transport, road traffic figures.

If development of a Regional MBT facility can be realised in the future then Gwynedd Council will be able to reappraise the preferred method for management of residual waste, inline with Generic Option 5. Should this situation occur it is quite possible that Gwynedd could rely on two options for treatment of residual waste; waste derived in the North of the County could be exported to the Regional facility, whilst waste from the Southern half, reflecting the additional logistical and financial difficulties could be treated at an in-County facility.

TABLE A6.1 - SUSTAINABILITY ASSESSMENT OBJECTIVES & CRITERIA FOR GWYNEDD MSW STRATEGY PROCESS

OBJECTIVES	INDICATORS/CRITERIA	METHOD OF MEASUREMENT
Environmental Objectives	**Environmental Indicators/Criteria**	**Method of Measurement**
1. To ensure prudent use of land and other resources	a) Depletion of resources, such as wood, water, fuels and ores (BPEO &SWMO) b) Landtake (SWMO only)	WISARD output result Professional judgement
2. To reduce greenhouse gas emissions	c) Greenhouse gases emitted (BPEO & SWMO)	WISARD output result
3. To minimise adverse impacts on air quality and public health	d) Emissions which are injurious to public health (BPEO &SWMO) e) Emissions contributing to air acidification (BPEO & SWMO) f) Emissions contributing to depletion of the ozone layer (BPEO & SWMO) g) Extent of odour problems (SWMO only) h) Extent of dust problems (SWMO problems)	WISARD output result WISARD output result WISARD output result Professional judgement Professional judgement
4. To conserve landscapes and townscapes	i) Extent of visual and landscape impacts (SWMO only)	Professional judgement
5. To protect local amenity	j) Extent of noise problems (SWMO only) k) Extent of litter and vermin problems (SWMO only)	Professional judgement Professional judgement
6. To minimise adverse effects on water quality	l) Emissions contributing to eutrophication (BPEO & SWMO) m) Extent of water pollution (SWMO only)	WISARD output result Professional judgement
Socio-economic Objectives	**Socio-economic Indicators/Criteria**	**Method of Measurement**
7. To minimise local transport impacts (congestion, severance, fear and intimidation, physical damage)	n) Total waste kilometres (by mode) (SWMO only) o) Transport along roads other than motorways (SWMO only)	WISARD input data WISARD input data
8. To provide employment opportunities	p) Number of jobs likely to be created (SWMO only)	Professional judgement
9. To provide opportunities for public involvement and education	q) Extent of opportunities for public involvement and education (concerning sustainable waste management practices) (SWMO only)	Professional judgement
Operational Objectives	**Operational Indicators/Criteria**	**Method of Measurement**
10. To minimise the increased costs of waste management	r) Costs of collection, management and disposal, including material & energy revenues (BPEO & SWMO)	Professional judgement
11. To ensure reliability of delivery	s) Likelihood of implementation within required timescale, taking account of maturity of technology, necessary level of public participation, and the need for planning permission (taking account of scale of development and likely perceived adverse impacts	Professional judgement
Waste Management Policy Objectives	**Waste Management Policy Indicators/Criteria**	**Method of Measurement**
12. To conform to waste policy	t) Percentage landfill (BPEO & SWMO) u) Percentage recycled/composted (BPEO & SWMO)	Agreed waste targets (Stage 2b report) Agreed waste targets (Stage 2b report)

Notes:
SWMO - Sustainable Waste Management Option process
BPEO - Best Practicable Environmental Option process

TABLE A6.2a - TOTAL WASTE FLOWS (Performance Scores)

Flow	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
CML-Air Acidification (g eq. H+)	-1,397,134	-5,966,862	-5,076,340	-6,136,713	-5,357,855	-8,750,880	-8,498,784
CML-Eutrophication (water) (g eq. PO4)	14,970,183	132,429,581	64,005,672	130,630,249	66,306,381	102,284,973	105,721,502
EB(R*Y)-Depletion of non renewable resources (yr-1)	-56,455,748	-241,485,478	-208,648,638	-252,433,419	-220,482,339	-367,218,229	-353,323,076
IPCC-Greenhouse effect (direct, 20 years) (g eq. CO2)	-99,004	-645,611	-442,470	-463,158	-420,075	-1,324,010	-1,269,861
CML-Human Toxicity (g)	53,877,151,396	-1,068,664	25,471,040,610	-414,996,757	23,304,493,190	-3,662,225,471	-545,382,269
WMO-Depletion of the ozone layer (average) (g eq. CFC-11)	35,092	6,438	21,069	8,891	20,837	7,447	6,237

TABLE A6.2b - TOTAL WASTE FLOWS (Value Scores)

Flow	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
CML-Air Acidification (g eq. H+)	0.00	0.62	0.50	0.64	0.54	1.00	0.97
CML-Eutrophication (water) (g eq. PO4)	1.00	0.00	0.58	0.02	0.56	0.26	0.23
EB(R*Y)-Depletion of non renewable resources (yr-1)	0.00	0.60	0.49	0.63	0.53	1.00	0.96
IPCC-Greenhouse effect (direct, 20 years) (g eq. CO2)	0.00	0.45	0.28	0.30	0.26	1.00	0.96
CML-Human Toxicity (g)	0.00	0.94	0.49	0.94	0.53	1.00	0.95
WMO-Depletion of the ozone layer (average) (g eq. CFC-11)	0.00	0.99	0.49	0.91	0.49	0.96	1.00
Total	1.00	3.59	2.83	3.44	2.92	5.21	5.05

TABLE A6.3a: TYPICAL BREAKDOWN OF LANDTAKE FOR EACH FACILITY TYPE

Facility type	Capacity (t/a)	Landtake1 (ha)
MRF - Clean	25,000	1.2
	15,000	0.8
	5,000	0.4
Composting - Windrow	15,000	15.0
	7,500	7.5
	5,000	5.0
	2,500	2.5
Composting - In vessel	25,000	1.3
	15,000	1.2
	10,000	0.8
	5,000	0.6
	2,500	0.4
EfW	160,000	1.5
	100,000	1.2
	70,000	0.8
	60,000	0.8
	50,000	0.7
	30,000	0.5
Landfill	200,000	25.0
	100,000	20.0
	75,000	15.0
HWRC Site	25,000	0.5
	20,000	0.5
	10,000	0.4
	5,000	0.3
Transfer Station	60,000	0.6
	40,000	0.5
	30,000	0.4
	20,000	0.3
	10,000	0.2
Anaerobic Digestion	50,000	0.4
	25,000	0.3
MBT (residual to EfW)	166,000	1.5
	100,000	1.2
MBT (residual to l/fill)	160,000	1.5
	100,000	1.2
	60,000	0.8

Notes:
1 - Landtake based on capacity and nature of facility

TABLE A6.3b: SUMMARY OF LANDTAKE IMPACTS FOR OPTIONS 0 TO 6

Description	MRF	Open Windrow Composting	In Vessel Composting	Anaerobic Digestion	Mechanical Biological Treatment	Energy from Waste	Landfill	HWRC Site	Transfer Station	Landtake[1] (ha)
Option 0	0.4	4.7	0.0	0.0	0.0	0.0	17.6	0.6	0.0	23.4
Option 1	1.3	6.2	3.2	0.0	0.0	0.0	5.7	1.1	0.0	17.6
Option 2	1.3	6.2	1.4	0.0	0.0	0.0	10.3	1.1	0.0	20.4
Option 3	1.3	6.2	0.7	0.3	0.0	0.0	6.4	1.1	0.0	16.0
Option 4	1.3	6.2	0.7	0.1	0.0	0.0	10.3	1.1	0.0	19.8
Option 5	1.3	6.2	0.7	0.0	0.5	0.0	5.6	1.1	0.9	16.4
Option 6	1.6	6.2	1.1	0.0	0.5	0.0	4.7	1.1	0.8	15.9

Notes:
1 - Highest value is least likely to be deliverable … lowest value is most likely to be deliverable
2 - Summary is calculated by multiplying facilities requirement and assigned factor

TABLE A6.4a: TYPICAL BREAKDOWN OF LITTER, DUST AND ODOUR SCORES FOR EACH FACILITY TYPE

Facility type	Capacity (t/a)	Aggregate Scores1	Covered storage2	Vehicle Movements2	Open or closed operations2
MRF - Clean	25,000	2	5	8.0	2
	15,000	1	4	6.5	2
	5,000	0	3	5.0	2
Composting - Windrow	15,000	8	10	5.0	10
	7,500	3	10	3.5	10
	5,000	2	10	3.0	10
	2,500	1	10	2.0	10
Composting - In vessel	25,000	2	6	7.0	2
	15,000	1	6	7.0	2
	10,000	1	5	5.0	2
	5,000	0	4	3.0	2
	2,500	0	3	2.0	2
EfW	160,000	6	2	9.0	2
	100,000	3	2	8.5	2
	70,000	2	2	8.0	2
	60,000	2	2	7.5	2
	50,000	1	2	7.0	2
	30,000	1	2	6.0	2
Landfill	200,000	200	10	10.0	10
	100,000	90	10	9.0	10
	75,000	60	10	8.0	10
HWRC Site	25,000	16	8	10.0	8
	20,000	12	8	9.0	8
	10,000	5	8	7.5	8
	5,000	2	8	6.0	8
Transfer Station	60,000	2	2	9.0	2
	40,000	1	2	9.0	2
	30,000	1	2	8.0	2
	20,000	1	2	7.0	2
	10,000	0	2	6.0	2
Anaerobic Digestion	50,000	1	2	6.0	2
	25,000	0	2	3.0	2
MBT (residual to EfW)	166,000	6	2	9.0	2
	100,000	3	2	8.5	2
MBT (residual to l/fill)	160,000	6	2	9.0	2
	100,000	3	2	8.0	2
	60,000	2	2	7.5	2

Notes:
Highest value has greatest odour, litter and dust impact
1 - Aggregate scores = (Capacity x Covered Storage x Vehicle movements x Open/closed facility)/1000000
2 - Nominal scale used for all variables (10 = worst, 0 = best)

TABLE A6.4b: SUMMARY OF LITTER/ODOUR/DUST IMPACTS FOR OPTIONS 0 TO 6

Description	MRF	Open Windrow Composting	In Vessel Composting	Anaerobic Digestion	Mechanical Biological Treatment	Energy from Waste	Landfill	HWRC Site	Transfer Station	Litter, Dust and Odour[1]
Option 0	0.4	1.4	0.0	0.0	0.0	0.0	70.5	7.8	0.0	80.0
Option 1	1.3	1.9	2.0	0.0	0.0	0.0	22.9	13.2	0.0	41.3
Option 2	1.3	1.9	0.9	0.0	0.0	0.0	41.3	13.2	0.0	58.6
Option 3	1.3	1.9	0.4	0.8	0.0	0.0	25.4	13.2	0.0	43.0
Option 4	1.3	1.9	0.4	0.2	0.0	0.0	41.3	13.2	0.0	58.4
Option 5	1.3	1.9	0.4	0.0	2.2	0.0	22.5	13.2	1.7	43.2
Option 6	1.6	1.9	0.7	0.0	1.8	0.0	18.8	13.2	1.4	39.3

Notes:
1 - Highest value is least desirable … lowest value is most desirable
2 - Summary is calculated by multiplying facilities requirement and assigned factor

TABLE A6.5a: CONSERVE TOWNSCAPES AND LANDSCAPES FOR EACH FACILITY TYPE

Facility type	Capacity (t/a)	Aggregate Scores1	Landscape Impact2	Height of facility2	Scale of facility3
MRF - Clean	25,000	36	6.0	5.0	1.2
	15,000	13	4.0	4.0	0.8
	5,000	2	2.0	3.0	0.4
Composting - Windrow	15,000	180	6.0	2.0	15.0
	7,500	42	4.5	1.3	7.5
	5,000	20	4.0	1.0	5.0
	2,500	8	3.0	1.0	2.5
Composting - In vessel	25,000	26	5.0	4.0	1.3
	15,000	24	5.0	4.0	1.2
	10,000	10	4.0	3.0	0.8
	5,000	4	3.0	2.0	0.6
	2,500	2	2.0	2.0	0.4
EfW	160,000	90	7.5	8.0	1.5
	100,000	67	7.0	8.0	1.2
	70,000	38	6.0	8.0	0.8
	60,000	30	5.0	8.0	0.8
	50,000	22	4.0	8.0	0.7
	30,000	8	2.0	8.0	0.5
Landfill	200,000	2,025	9.0	9.0	25.0
	100,000	1,280	8.0	8.0	20.0
	75,000	735	7.0	7.0	15.0
HWRC Site	25,000	16	8.0	4.0	0.5
	20,000	14	7.5	4.0	0.5
	10,000	9	6.5	3.5	0.4
	5,000	5	6.0	3.0	0.3
Transfer Station	60,000	17	7.0	4.0	0.6
	40,000	14	7.0	4.0	0.5
	30,000	10	6.0	4.0	0.4
	20,000	5	4.0	4.0	0.3
	10,000	1	2.0	3.0	0.2
Anaerobic Digestion	50,000	2	3.0	2.0	0.4
	25,000	1	2.0	2.0	0.3
MBT (residual to EfW)	166,000	95	7.0	9.0	1.5
	100,000	67	7.0	8.0	1.2
MBT (residual to l/fill)	160,000	84	7.0	8.0	1.5
	100,000	58	6.0	8.0	1.2
	60,000	32	5.0	8.0	0.8

Notes:
Highest value has greatest impact on landscape
1 - Aggregate scores = Landscape impact x facility height x Scale of facility
2 - Nominal scale used for landscape impact and facility height (10 = worst, 0 = best)
3 - Scale of facility related to landtake factor

TABLE A6.5b: SUMMARY OF LANDSCAPE IMPACTS FOR OPTIONS 0 TO 6

Description	MRF	Open Windrow Composting	In Vessel Composting	Anaerobic Digestion	Mechanical Biological Treatment	Energy from Waste	Landfill	HWRC Site	Transfer Station	Landscape[1]
Option 0	7	18.7	0.0	0.0	0.0	0.00	863.1	14.7	0.0	903.2
Option 1	21	24.8	39.0	0.0	0.0	0.00	280.5	25.1	0.0	390.7
Option 2	21	24.8	16.8	0.0	0.0	0.00	506.3	25.1	0.0	594.5
Option 3	21	24.8	8.5	1.5	0.0	0.00	311.5	25.1	0.0	392.9
Option 4	21	24.8	8.5	0.5	0.0	0.00	506.4	25.1	0.0	586.6
Option 5	21	24.8	8.5	0.0	34.3	0.00	275.6	25.1	14.5	404.3
Option 6	26	24.8	13.4	0.0	28.6	0.00	229.7	25.1	12.1	359.3

Notes:
1 - Highest value is least desirable … lowest value is most desirable
2 - Summary is calculated by multiplying facilities requirement and assigned factor

TABLE A6.6a: TYPICAL BREAKDOWN OF NOISE SCORES FOR EACH FACILITY

Facility type	Capacity (t/a)	Aggregate Scores1	Noisy Plant & Machinery2	Vehicle Movements2	Hours of Operation3 (hrs/yr)
MRF - Clean	25,000	14.7	7.0	8.0	2,625
	15,000	10.2	6.0	6.5	2,625
	5,000	6.6	5.0	5.0	2,625
Composting - Windrow	15,000	5.3	4.0	5.0	2,625
	7,500	3.0	3.3	3.5	2,625
	5,000	2.4	3.0	3.0	2,625
	2,500	1.1	2.0	2.0	2,625
Composting - In vessel	25,000	10.1	5.5	7.0	2,625
	15,000	9.2	5.0	7.0	2,625
	10,000	5.3	4.0	5.0	2,625
	5,000	2.4	3.0	3.0	2,625
	2,500	1.1	2.0	2.0	2,625
EfW	160,000	45.4	7.0	9.0	7,200
	100,000	39.8	6.5	8.5	7,200
	70,000	34.6	6.0	8.0	7,200
	60,000	29.7	5.5	7.5	7,200
	50,000	25.2	5.0	7.0	7,200
	30,000	17.3	4.0	6.0	7,200
Landfill	200,000	23.6	9.0	10.0	2,625
	100,000	16.5	7.0	9.0	2,625
	75,000	12.6	6.0	8.0	2,625
HWRC Site	25,000	13.1	5.0	10.0	2,625
	20,000	11.2	4.8	9.0	2,625
	10,000	8.3	4.5	7.0	2,625
	5,000	6.3	4.0	6.0	2,625
Transfer Station	60,000	20.1	8.5	9.0	2,625
	40,000	18.9	8.0	9.0	2,625
	30,000	14.7	7.0	8.0	2,625
	20,000	11.0	6.0	7.0	2,625
	10,000	7.9	5.0	6.0	2,625
Anaerobic Digestion	50,000	6.3	4.0	6.0	2,625
	25,000	2.4	3.0	3.0	2,625
MBT (residual to EfW)	166,000	45.4	7.0	9.0	7,200
	100,000	39.8	6.5	8.5	7,200
MBT (residual to l/fill)	160,000	45.4	7.0	9.0	7,200
	100,000	34.6	6.0	8.0	7,200
	60,000	29.7	5.5	7.5	7,200

Notes:
Highest value has greatest noise impact
1 - Aggregate scores = Noisy Plant and Machinery x Vehicle movements x Hours of Operation/10000
2 - Nominal scale used for all variables (10 = worst, 0 = best)
3 - Hours of operation based on typical yearly figures (2625 hrs = 52.5hrs/wk x 50wks, 7200hrs = 20hrs/day x 52wks)

TABLE A6.6b: SUMMARY OF NOISE IMPACTS FOR OPTIONS 0 TO 6

Description	MRF	Open Windrow Composting	In Vessel Composting	Anaerobic Digestion	Mechanical Biological Treatment	Energy from Waste	Landfill	HWRC Site	Transfer Station	Noise[1]
Option 0	5.3	2.2	0.0	0.0	0.0	0.0	14.8	13.4	0.0	35.7
Option 1	17.2	2.9	21.3	0.0	0.0	0.0	4.8	22.8	0.0	69.0
Option 2	17.2	2.9	9.2	0.0	0.0	0.0	8.7	22.8	0.0	60.7
Option 3	17.2	2.9	4.7	4.0	0.0	0.0	5.3	22.8	0.0	56.9
Option 4	17.2	2.9	4.7	1.2	0.0	0.0	8.7	22.8	0.0	57.4
Option 5	17.2	2.9	4.7	0.0	16.5	0.0	4.7	22.8	33.3	102.0
Option 6	20.6	2.9	7.3	0.0	13.7	0.0	3.9	22.8	27.7	99.0

Notes:
1 - Highest value is least desirable … lowest value is most desirable
2 - Summary is calculated by multiplying facilities requirement and assigned factor

TABLE A6.7a: TYPICAL BREAKDOWN OF WATER CONTAMINATION IMPACT SCORES FOR EACH FACILITY

Facility type	Capacity (t/a)	Aggregate Scores1	Covered storage2	Water releases 2	Open or closed operations2
MRF - Clean	25,000	1.0	5	4	2
	15,000	0.4	4	3	2
	5,000	0.1	3	2	2
Composting - Windrow	15,000	13.5	10	9	10
	7,500	4.5	10	6	10
	5,000	2.5	10	5	10
	2,500	1.0	10	4	10
Composting - In vessel	25,000	2.0	6	7	2
	15,000	1.1	6	6	2
	10,000	0.5	5	5	2
	5,000	0.2	4	4	2
	2,500	0.0	3	3	2
EfW	160,000	1.3	2	2	2
	100,000	0.8	2	2	2
	70,000	0.6	2	2	2
	60,000	0.5	2	2	2
	50,000	0.4	2	2	2
	30,000	0.2	2	2	2
Landfill	160,000	160.0	10	10	10
	100,000	100.0	10	10	10
	75,000	71.3	10	10	10
HWRC Site	25,000	9.6	8	6	8
	20,000	7.7	8	6	8
	10,000	3.2	8	5	8
	5,000	1.0	8	3	8
Transfer Station	60,000	0.5	2	2	2
	40,000	0.5	2	3	2
	30,000	0.4	2	3	2
	20,000	0.2	2	3	2
	10,000	0.1	2	2	2
Anaerobic Digestion	50,000	0.6	2	3	2
	25,000	0.2	2	2	2
MBT (residual to EfW)	166,000	2.7	2	4	2
	100,000	0.8	2	2	2
MBT (residual to l/fill)	160,000	3.8	2	6	2
	100,000	2.4	2	6	2
	60,000	1.2	2	5	2

Notes
Highest value has greatest water contamination impact
1 - Aggregate scores = (Capacity x Covered Storage x Water releases x Open/closed facility)/10,000,00
2 - Nominal scale used for all variables (10 = worst, 0 = best)

TABLE A6.7b: SUMMARY OF WATER CONTAMINATION IMPACTS FOR OPTIONS 0 TO 6

Description	MRF	Open Windrow Composting	In Vessel Composting	Anaerobic Digestion	Mechanical Biological Treatment	Energy from Waste	Landfill	HWRC Site	Transfer Station	Water Contamination[1]
Option 0	0	2.3	0.0	0.0	0.0	0.0	83.7	5.2	0.0	91.4
Option 1	1	3.1	2.0	0.0	0.0	0.0	27.2	8.8	0.0	41.7
Option 2	1	3.1	0.9	0.0	0.0	0.0	49.1	8.8	0.0	62.5
Option 3	1	3.1	0.4	0.4	0.0	0.0	30.2	8.8	0.0	43.5
Option 4	1	3.1	0.4	0.1	0.0	0.0	49.1	8.8	0.0	62.2
Option 5	1	3.1	0.4	0.0	1.0	0.0	26.7	8.8	0.7	41.4
Option 6	1	3.1	0.7	0.0	0.8	0.0	22.3	8.8	0.6	37.0

Notes:
1 - Highest value is least desirable … lowest value is most desirable
2 - Summary is calculated by multiplying facilities requirement and assigned factor

TABLE A6.8: ESTIMATED TOTAL ANNUAL KILOMETRES SPLIT BY ROAD TYPE FOR ALL OPTIONS

Description	Gwynedd split (%)[1]	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
B Roads	71%	2,791,170	2,923,048	2,901,934	3,097,523	3,081,130	3,625,460	3,507,332
A Roads	11%	432,435	452,867	449,595	479,898	477,358	561,691	543,389
Motorway	18%	707,620	741,055	735,702	785,288	781,132	919,131	889,183
Total	**100%**	**3,931,225**	**4,116,970**	**4,087,231**	**4,362,708**	**4,339,620**	**5,106,282**	**4,939,904**

Note
1. Average taken from trips assumed to waste technology treatments.

TABLE A6.9a: TYPICAL BREAKDOWN OF EMPLOYMENT OPPORTUNITIES SCORES FOR EACH FACILITY TYPE

Facility type	Capacity (t/a)	No of Jobs created1
MRF - Clean	25,000	10
	15,000	8
	5,000	6
Composting - Windrow	15,000	7
	7,500	6
	5,000	5
	2,500	3
Composting - In vessel	25,000	10
	15,000	9
	10,000	6
	5,000	4
	2,500	3
EfW	160,000	18
	100,000	14
	70,000	12
	60,000	11
	50,000	10
	30,000	8
Landfill	200,000	8
	100,000	5
	75,000	5
HWRC Site	25,000	3
	20,000	3
	10,000	3
	5,000	2
Transfer Station	60,000	6
	40,000	5
	30,000	5
	20,000	4
	10,000	3
Anaerobic Digestion	50,000	3
	25,000	2
MBT (residual to EfW)	166,000	18
	100,000	14
MBT (residual to l/fill)	160,000	18
	100,000	14
	60,000	11
Inert reprocessing	75,000	4
	30,000	3

Notes:
1 - Employment score = estimate for type of plant, size of plant and hours of operation
No scaling factor … absolute job numbers

TABLE A6.9b: SUMMARY OF EMPLOYMENT OPPORTUNITIES FOR OPTIONS 0 TO 6

Description	MRF	Open Windrow Composting	In Vessel Composting	Anaerobic Digestion	Mechanical Biological Treatment	Energy from Waste	Landfill	HWRC Site	Transfer Station	Employment[1]
Option 0	4.2	4.7	0.0	0.0	0.0	0.0	5.9	4.8	0.0	19.6
Option 1	13.4	6.2	24.4	0.0	0.0	0.0	1.9	8.3	0.0	54.1
Option 2	13.4	6.2	10.5	0.0	0.0	0.0	3.4	8.3	0.0	41.8
Option 3	13.4	6.2	5.3	1.9	0.0	0.0	2.1	8.3	0.0	37.2
Option 4	13.4	6.2	5.3	0.6	0.0	0.0	3.4	8.3	0.0	37.2
Option 5	13.4	6.2	5.3	0.0	6.5	0.0	1.9	8.3	12.1	53.7
Option 6	16.1	6.2	8.4	0.0	5.5	0.0	1.6	8.3	10.1	56.0

Notes:
1 - Highest value is most desirable … lowest value is least desirable
2 - Summary is calculated by multiplying facilities requirement and assigned factor

TABLE A6.10a: TYPICAL BREAKDOWN OF PUBLIC INVOLVEMENT SCORES FOR EACH FACILITY TYPE

Facility type	Capacity (t/a)	Aggregate Scores1	Sending right message2	Potential for public involvement3
MRF - Clean	25,000	20	10	2.0
	15,000	20	10	2.0
	5,000	20	10	2.0
Composting - Windrow	15,000	40	10	4.0
	7,500	30	10	3.0
	5,000	30	10	3.0
	2,500	30	10	3.0
Composting - In vessel	25,000	40	10	4.0
	15,000	40	10	4.0
	10,000	30	10	3.0
	5,000	30	10	3.0
	2,500	30	10	3.0
EfW	160,000	9	3	3.0
	100,000	8	3	2.5
	70,000	6	3	2.0
	60,000	6	3	2.0
	50,000	6	3	2.0
	30,000	6	3	2.0
Landfill	200,000	2	1	2.0
	100,000	2	1	2.0
	75,000	2	1	2.0
HWRC Site	25,000	50	10	5.0
	20,000	50	10	5.0
	10,000	50	10	5.0
	5,000	50	10	5.0
Transfer Station	60,000	3	3	1.0
	40,000	3	3	1.0
	30,000	3	3	1.0
	20,000	3	3	1.0
	10,000	3	3	1.0
Anaerobic Digestion	50,000	7	7	1.0
	25,000	7	7	1.0
MBT (residual to EfW)	166,000	50	10	5.0
	100,000	40	10	4.0
MBT (residual to l/fill)	160,000	45	10	4.5
	100,000	40	10	4.0
	60,000	40	10	4.0
Inert reprocessing	75,000	10	10	1.0
	30,000	10	10	1.0

Notes:
Highest value has least opportunity for public involvement
1 - Aggregate scores = Sending right message x potential for public involvement in recycling/composting
2 - Nominal scale used for sending right message (10 = best, 0 = worst)
3 - Nominal scale used for potential for public involvement in recycling /composting (1 = worst, 5 = best)

TABLE A6.10b: SUMMARY OF PUBLIC INVOLVEMENT OPPORTUNITIES FOR OPTIONS 0 TO 6

Description	MRF	Open Windrow Composting	In Vessel Composting	Anaerobic Digestion	Mechanical Biological Treatment	Energy from Waste	Landfill	HWRC Site	Transfer Station	Public Involvement[1]
Option 0	10.4	28.1	0.0	0.0	0.0	0.0	2.3	80.7	0.0	121.6
Option 1	33.5	37.2	121.8	0.0	0.0	0.0	0.8	137.7	0.0	330.9
Option 2	33.5	37.2	52.7	0.0	0.0	0.0	1.4	137.7	0.0	262.4
Option 3	33.5	37.2	26.7	4.4	0.0	0.0	0.8	137.7	0.0	240.3
Option 4	33.5	37.2	26.7	1.3	0.0	0.0	1.4	137.7	0.0	237.7
Option 5	33.5	37.2	26.7	0.0	18.2	0.0	0.8	137.7	9.0	263.0
Option 6	40.2	37.2	41.8	0.0	15.1	0.0	0.6	137.7	7.5	280.1

Notes:
1 - Highest value is most desirable … lowest value is least desirable
2 - Summary is calculated by multiplying facilities requirement and assigned factor

TABLE A11a: UNIT COSTS FOR WASTE MANAGEMENT AND TRANSFER ROUTES

MSW	Unit Cost (£/tonne)	Notes
Waste to CA site	3	Operating cost for CA site(£3/t) & ignores transport to CA site by private car
CA site to MRF	35	Nett cost for operation of MRF incorporating revenue from recyclate sales(£35/t)
CA site to Composting (OW)	15	Nett operational cost and assuming zero revenue for compost (£15/t)
CA site to landfill	70	Landfill operating cost (£35/t) +£35 tax (ODPM Dec 2002) [4]
Waste to Transfer station	61	Refuse collection cost (£58/t) plus operating cost for transfer station (£3/t)
Transfer station to landfill	70	Landfill operating cost (£35/t) +£35 tax (ODPM Dec 2002) [4]
Transfer station to EfW	50	Nett cost for EfW operation (£40/t) incl. energy recovery, fly ash disposal to landfill & bottom ash to inert C10reprocessing
Transfer Station to MBT	45	Nett cost for MBT operation (£45/t)
Direct Waste to MBT	103	Refuse collection cost (£58/t) plus operating cost for MBT unit (£45/t)
MBT residue to Landfill	70	Landfill operating cost (£35/t) +£35 tax (ODPM Dec 2002) [4]
Direct Waste to MRF	115	Cost of dry recyclables collection (£80/t)plus nett cost for MRF operation incl. revenue cost for recyclate sales (£35/t)
Waste to Composting OW	80	Biodegradable collection cost (£65/t) plus operating costs for composting facility (£15/t)
Direct Waste to Landfill	128	Refuse collection cost (£58/t) plus landfill operating cost (£35/t) plus £35 tax (ODPM Dec 2002) [4]
Direct Waste to EfW	108	Refuse collection cost (£58/t) plus EfW nett operating cost (£50/t) incl. ash disposal to landfill
Direct Waste to Anaerobic Digestion (AD)	125	Biodegradable collection cost (£65/t) plus operating cost for AD unit (£60/t)
Direct Waste to Composting in-vessel (IV)	110	Biodegradable collection cost (£65/t)plus operating cost for IV unit (£45/t)

Notes

1. Presented costs are based on 2010 tonnages and assume current gate prices (2002).
2. Unit costs have been taken from a range of sources and modified where necessary.
3. Management costs associated with exotic waste streams have been ignored as they are not a significant proportion of overall tonnages
4. Landfill tax for non inerts assumed to rise to £35/t by 2010 and operational costs assumed to rise to £35/t by 2010. For inert wastes costs assumed to rise to £15/t by 2010 including any landfill tax increases (Waste Not, Want Not, ODPM Dec 2002).

TABLE A11b: TOTAL WASTE MANAGEMENT COSTS FOR OPTIONS 0 TO 6

	Net Annual Cost	£/tonne
Option 0	£12,598,955	£115
Option 1	£9,577,842	£98
Option 2	£10,128,104	£101
Option 3	£9,989,579	£101
Option 4	£10,311,666	£103
Option 5	£10,704,599	£108
Option 6	£9,917,535	£103

Notes

1. Presented costs are based on 2013 tonnages and assume current gate prices (2002).
2. Unit costs have been taken from a range of sources and modified where necessary.
3. Management costs associated with exotic waste streams have been ignored as they are not a significant proportion of overall tonnages
4. Landfill tax assumed to rise to £35/t by 2013 and operational costs assumed to rise to £35/t by 2013

TABLE A6.12a: TYPICAL BREAKDOWN OF DELIVERABILITY SCORES FOR EACH FACILITY TYPE

Facility type	Capacity (t/a)	Aggregate Scores[1]	Planning likelihood[2]	Perceived Adverse Impacts[2]	Hours of Operation[2] (hrs/yr)
MRF - Clean	25,000	9.5	6.0	6.0	2,625
	15,000	4.2	4.0	4.0	2,625
	5,000	1.1	2.0	2.0	2,625
Composting - Windrow	15,000	9.5	6.0	6.0	2,625
	7,500	7.9	5.5	5.5	2,625
	5,000	6.6	5.0	5.0	2,625
	2,500	4.2	4.0	4.0	2,625
Composting - In vessel	25,000	14.8	7.5	7.5	2,625
	15,000	12.9	7.0	7.0	2,625
	10,000	6.6	5.0	5.0	2,625
	5,000	2.4	3.0	3.0	2,625
	2,500	0.5	1.0	2.0	2,625
EfW	160,000	87.1	11.0	11.0	7,200
	100,000	79.4	10.5	10.5	7,200
	70,000	72.0	10.0	10.0	7,200
	60,000	65.0	9.5	9.5	7,200
	50,000	58.3	9.0	9.0	7,200
	30,000	46.1	8.0	8.0	7,200
Landfill	200,000	26.3	10.0	10.0	2,625
	100,000	21.3	9.0	9.0	2,625
	75,000	19.0	8.5	8.5	2,625
HWRC Site	25,000	16.8	8.0	8.0	2,625
	20,000	14.8	7.5	7.5	2,625
	10,000	12.9	7.0	7.0	2,625
	5,000	9.5	6.0	6.0	2,625
Transfer Station	60,000	13.8	7.0	7.5	2,625
	40,000	12.9	7.0	7.0	2,625
	30,000	9.5	6.0	6.0	2,625
	20,000	4.2	4.0	4.0	2,625
	10,000	1.1	2.0	2.0	2,625
Anaerobic Digestion	50,000	12.9	7.0	7.0	2,625
	25,000	6.6	5.0	5.0	2,625
MBT (residual to EfW)	166,000	72.0	10.0	10.0	7,200
	100,000	65.0	9.5	9.5	7,200
MBT (residual to l/fill)	160,000	58.3	9.0	9.0	7,200
	100,000	46.1	8.0	8.0	7,200
	60,000	35.3	7.0	7.0	7,200

Notes:
Highest value is least likely to be deliverable … lowest value is most likely to be deliverable
1 - Aggregate scores = Planning likelihood x perceived adverse impacts x hours of operation/10000
2 - Nominal scale used for planning likelihood and perceived adverse impacts (11 = worst, 0 = best)
3 - Hours of operation based on typical yearly figures (2625 hrs = 52.5hrs/wk x 50wks, 7200hrs = 20hrs/day x 52wks)

TABLE A6.12b: SUMMARY OF DELIVERABILITY FOR OPTIONS 1 TO 6

Description	MRF	Open Windrow Composting	In Vessel Composting	Anaerobic Digestion	Mechanical Biological Treatment	Energy from Waste	Landfill	HWRC Site	Transfer Station	Deliverability[1]
Option 0	2.2	6.1	0.0	0.0	0.0	0.0	22.3	20.8	0.0	51.4
Option 1	7.0	8.1	26.6	0.0	0.0	0.0	7.2	35.4	0.0	84.5
Option 2	7.0	8.1	11.5	0.0	0.0	0.0	13.1	35.4	0.0	75.2
Option 3	7.0	8.1	5.8	8.2	0.0	0.0	8.0	35.4	0.0	72.6
Option 4	7.0	8.1	5.8	2.5	0.0	0.0	13.1	35.4	0.0	72.0
Option 5	7.0	8.1	5.8	0.0	26.2	0.0	7.1	35.4	12.7	102.4
Option 6	8.4	8.1	9.1	0.0	21.8	0.0	5.9	35.4	10.6	99.4

Notes:
1 - Highest value is least likely to be deliverable … lowest value is most likely to be deliverable
2 - Summary is calculated by multiplying facilities requirement and assigned factor

TABLE A6.13 - SUMMARY OF RECYCLING AND LANDFILL PERFORMANCE (%) FOR ALL OPTIONS

Option	% recycling [1]	% landfill [2]
Option 0	12.70%	87.30%
Option 1	40.00%	28.46%
Option 2	40.00%	51.38%
Option 3	40.00%	31.62%
Option 4	40.00%	51.38%
Option 5	47.20%	27.97%
Option 6	56.00%	23.31%

Notes

1. Includes source segregated dry recyclables and compostables, and dry recyclables from MBT.
2. Includes direct to landfill, ash to landfill and biostabilised waste to landfill.
3 Remaining percentage unaccounted for is treated through IV, AD, MBT biostabilisation or EfW.

TABLE A6.14: OVERALL PERFORMANCE SCORES FOR OPTIONS 0 TO 6

Sustainability Objective	Sustainability Criteria	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Comments
Minimise Costs	Net Revenue Costs (£/t)	£114.87	£98.04	£101.28	£101.37	£103.45	£108.30	£103.25	A lower score is preferable
Conform with Waste Policy	% Landfill	87%	28%	51%	32%	51%	28%	23%	A lower score is preferable
	% Recycling & Composting	13%	40%	40%	40%	40%	47%	56%	A higher score is preferable
Ensure Reliability of Delivery	Planning Likelihood, Operating Hours, etc.	51	84	75	73	72	102	99	A lower score is preferable
Conserve Landscapes and Townscapes	Nature, scale and number of facilities	903	391	594	393	587	404	359	A lower score is preferable
Protect Local Amenity	Noise	36	69	61	57	57	102	99	A lower score is preferable
Sensitivity Analysis (Large Facilities)	Litter	80	41	59	43	58	43	39	A lower score is preferable
Minimise Local Transport Impact	Total Waste Kilometres	3,931,225km	4,116,970km	4,087,231km	4,362,708km	4,339,620km	5,106,282km	4,939,904km	A lower score is preferable
	Transport along roads other than motorways	3,223,604km	3,375,915km	3,351,530km	3,577,421km	3,558,488km	4,187,151km	4,050,721km	A lower score is preferable
Create Employemnt Opportunities	Number of jobs created	20	54	42	37	37	54	56	A higher score is preferable
Opportunities for Public Involvement	Potential for participating in recycling/composting	122	331	262	240	238	263	280	A higher score is preferable
Prudent Landuse	Resource Depletion	-5.65E+07	-2.41E+08	-2.09E+08	-2.52E+08	-2.20E+08	-3.67E+08	-3.53E+08	A lower score is preferable
	Landtake	23	18	20	16	20	16	16	A lower score is preferable
Reduce Greenhouse Gases	Total CO_2 Emissions	-9.90E+04	-6.46E+05	-4.42E+05	-4.63E+05	-4.20E+05	-1.32E+06	-1.27E+06	A lower score is preferable
Minimise Air Quality	Human Toxicity	5.39E+10	-1.07E+06	2.55E+10	-4.15E+08	2.33E+10	-3.66E+09	-5.45E+08	A lower score is preferable
	Air Acidification	-1.40E+06	-5.97E+06	-5.08E+06	-6.14E+06	-5.36E+06	-8.75E+06	-8.50E+06	A lower score is preferable
	Ozone Depletion	3.51E+04	6.44E+03	2.11E+04	8.89E+03	2.08E+04	7.45E+03	6.24E+03	A lower score is preferable
	Odour	80	41	59	43	58	43	39	A lower score is preferable
	Dust	80	41	59	43	58	43	39	A lower score is preferable
Minimise Water Quality	Eutrophication	1.50E+07	1.32E+08	6.40E+07	1.31E+08	6.63E+07	1.02E+08	1.06E+08	A lower score is preferable
	Potential extent of water contamination	91	42	62	44	62	41	37	A lower score is preferable

Notes:
Units for each criteria vary

TABLE A6.15: VALUED PERFORMANCE SCORES FOR OPTIONS 0 TO 6

Sustainability Objective	Sustainability Criteria	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Minimise Costs	Net Revenue Costs (£/t)	0.00	1.00	0.81	0.80	0.68	0.39	0.69
Conform with Waste Policy	% Landfill	0.00	0.92	0.56	0.87	0.56	0.93	1.00
	% Recycling & Composting	0.00	0.63	0.63	0.63	0.63	0.80	1.00
Ensure Reliability of Delivery	Planning Likelihood, Operating Hours, etc.	1.00	0.35	0.53	0.58	0.60	0.00	0.06
Conserve Landscapes and Townscapes	Nature, scale and number of facilities	0.00	0.94	0.57	0.94	0.58	0.92	1.00
Protect Local Amenity	Noise Impact	1.00	0.50	0.62	0.68	0.67	0.00	0.05
	Litter Impact	0.00	0.95	0.53	0.91	0.53	0.90	1.00
Minimise Local Transport Impact	Total Waste Kilometres	1.00	0.84	0.87	0.63	0.65	0.00	0.14
	Transport along roads other than motorways	1.00	0.84	0.87	0.63	0.65	0.00	0.14
Create Employment Opportunities	Number of jobs created	0.00	0.95	0.61	0.49	0.49	0.94	1.00
Opportunities for Public Involvement	Potential for participating in recycling/composting	0.00	1.00	0.67	0.57	0.55	0.68	0.76
Prudent Landuse	Resource Depletion	0.00	0.60	0.49	0.63	0.53	1.00	0.96
	Landtake	0.00	0.77	0.40	0.99	0.48	0.93	1.00
Reduce Greenhouse Gases	Total CO_2 Emissions	0.00	0.45	0.28	0.30	0.26	1.00	0.96
Minimise Air Quality Impact	Human Toxicity	0.00	0.94	0.49	0.94	0.53	1.00	0.95
	Air Acidification	0.00	0.62	0.50	0.64	0.54	1.00	0.97
	Ozone Depletion	0.00	0.99	0.49	0.91	0.49	0.96	1.00
	Odour	0.00	0.95	0.53	0.91	0.53	0.90	1.00
	Dust	0.00	0.95	0.53	0.91	0.53	0.90	1.00
Minimise Water Quality Impact	Eutrophication	1.00	0.00	0.58	0.02	0.56	0.26	0.23
	Potential extent of water contamination	0.00	0.91	0.53	0.88	0.54	0.92	1.00
TOTAL VALUED PERFORMANCE SCORES FOR ALL CRITERIA (SWMO)		**5.00**	**16.11**	**12.08**	**14.86**	**11.60**	**14.42**	**15.88**
TOTAL VALUED PERFORMANCE SCORES FOR BPEO CRITERIA ONLY		**2.00**	**6.49**	**5.37**	**6.33**	**5.38**	**7.33**	**7.80**

Note: A score of 1 represents the best option … a score of 0 represents the worst of options
For all criteria a maximum possible score is 21
For BPEO criteria only a maximum possible score is 10

TABLE A6.16: WEIGHTING OF EVALUATION CRITERIA (Gwynedd Consultation response)

OBJECTIVES			INDICATORS/CRITERIA		
Environmental Objectives	**Weighting**	**Ranking**	**Environmental Indicators**	**Weighting**	**Ranking**
1. To ensure prudent use of land and other resources	11.4%	3	a) Depletion of resources, such as wood, water, fuels and ores	10.2%	2
			b) Landtake	1.3%	15
2. To reduce greenhouse gas emissions	8.6%	5	c) Greenhouse gases emitted	8.6%	5
3. To minimise adverse impacts on air quality and public health	16.5%	2	d) Emissions which are injurious to public health	9.0%	4
			e) Emissions contributing to air acidification	1.1%	18
			f) Emissions contributing to depletion of the ozone layer	4.1%	11
			g) Extent of odour problems	1.3%	15
			h) Extend of dust problems	1.0%	19
4. To conserve landscapes and townscapes	2.2%	12	i) Extent of visual and landscape impacts	2.2%	14
5. To protect local amenity	4.1%	10	j) Extent of noise problems	0.8%	20
			k) Extent of litter and vermin problems	3.3%	12
6. To minimise adverse effects on water quality	7.5%	7	l) Emissions contributing to eutrophication	0.5%	21
			m) Extent of water pollution	7.0%	7
Socio-economic Objectives	**Weighting**	**Ranking**	**Socio-economic Indicators**	**Weighting**	**Ranking**
7. To minimise local transport impacts (congestion, severance, fear and	6.8%	8	n) Total waste kilometres (by mode)	5.6%	8
			o) Transport along roads other than motorways	1.1%	17
8. To provide employment opportunities	9.6%	4	p) Number of jobs likely to be created	9.6%	3
9. To provide opportunities for public involvement and education	8.5%	6	q) Extent of opportunities for public involvement and education (concerning sustainable waste management practices)	8.5%	6
Operational Objectives	**Weighting**	**Ranking**	**Operational Indicators**	**Weighting**	**Ranking**
10. To minimise the increased costs of waste management	4.6%	9	r) Costs of collection, management and disposal, including material and energy revenues	4.6%	10
11. To ensure reliability of delivery	3.0%	11	s) Likelihood of implementation within required timescale, taking account of maturity of technology, necessary level of public participation, and the need for planning permission (taking account of scale of development and likely perceived	3.0%	13
Waste Management Policy Objectives	**Weighting**	**Ranking**	**Waste Management Policy Indicators**	**Weighting**	**Ranking**
12. To conform to waste policy	17.2%	1	t) Percentage landfill	5.1%	9
			u) Percentage recycled/composted	12.1%	1

TABLE A6.17: WEIGHTED 'VALUED PERFORMANCE' SCORES FOR OPTIONS 0 TO 6

	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Weighted Performance Scores							
SWMO Assessment (all criteria)[2]	7	2	5	4	6	3	1
BPEO Assessment (BPEO criteria)[2]	7	3	6	4	5	2	1

TABLE A6.18: WEIGHTING OF EVALUATION CRITERIA (Anglesey Consultation response)

OBJECTIVES			INDICATORS/CRITERIA		
Environmental Objectives	**Weighting**	**Ranking**	**Environmental Indicators**	**Weighting**	**Ranking**
1. To ensure prudent use of land and other resources	7.5%	5	a) Depletion of resources, such as wood, water, fuels and ores	5.7%	6
			b) Landtake	1.8%	18
2. To reduce greenhouse gas emissions	5.4%	8	c) Greenhouse gases emitted	5.4%	7
3. To minimise adverse impacts on air quality and public health	15.6%	2	d) Emissions which are injurious to public health	6.5%	5
			e) Emissions contributing to air acidification	1.5%	20
			f) Emissions contributing to depletion of the ozone layer	2.7%	14
			g) Extent of odour problems	2.6%	15
			h) Extend of dust problems	2.1%	16
4. To conserve landscapes and townscapes	3.4%	12	i) Extent of visual and landscape impacts	3.4%	12
5. To protect local amenity	4.9%	9	j) Extent of noise problems	1.5%	20
			k) Extent of litter and vermin problems	3.3%	13
6. To minimise adverse effects on water quality	5.5%	7	l) Emissions contributing to eutrophication	1.7%	19
			m) Extent of water pollution	3.8%	11
Socio-economic Objectives	**Weighting**	**Ranking**	**Socio-economic Indicators**	**Weighting**	**Ranking**
7. To minimise local transport impacts (congestion, severance, fear and	10.0%	4	n) Total waste kilometres (by mode)	8.1%	3
			o) Transport along roads other than motorways	1.9%	17
8. To provide employment opportunities	10.1%	3	p) Number of jobs likely to be created	10.1%	2
9. To provide opportunities for public involvement and education	6.9%	6	q) Extent of opportunities for public involvement and education (concerning sustainable waste management practices)	6.9%	4
Operational Objectives	**Weighting**	**Ranking**	**Operational Indicators**	**Weighting**	**Ranking**
10. To minimise the increased costs of waste management	4.2%	11	r) Costs of collection, management and disposal, including material and energy revenues	4.2%	10
11. To ensure reliability of delivery	4.5%	10	s) Likelihood of implementation within required timescale, taking account of maturity of technology, necessary level of public participation, and the need for planning permission (taking account of scale of development and likely perceived	4.5%	9
Waste Management Policy Objectives	**Weighting**	**Ranking**	**Waste Management Policy Indicators**	**Weighting**	**Ranking**
12. To conform to waste policy	22.0%	1	t) Percentage landfill	5.2%	8
			u) Percentage recycled/composted	16.8%	1

TABLE A6.19: WEIGHTING OF EVALUATION CRITERIA (North Wales Consultation response)

OBJECTIVES			INDICATORS/CRITERIA		
Environmental Objectives	**Weighting**	**Ranking**	**Environmental Indicators**	**Weighting**	**Ranking**
1. To ensure prudent use of land and other resources	8.2%	3	a) Depletion of resources, such as wood, water, fuels and ores	6.2%	6
			b) Landtake	2.0%	19
2. To reduce greenhouse gas emissions	3.5%	11	c) Greenhouse gases emitted	3.5%	11
3. To minimise adverse impacts on air quality and public health	19.3%	2	d) Emissions which are injurious to public health	8.5%	3
			e) Emissions contributing to air acidification	2.6%	16
			f) Emissions contributing to depletion of the ozone layer	3.4%	12
			g) Extent of odour problems	2.2%	18
			h) Extend of dust problems	2.6%	15
4. To conserve landscapes and townscapes	5.0%	9	i) Extent of visual and landscape impacts	5.0%	8
5. To protect local amenity	5.3%	8	j) Extent of noise problems	2.9%	14
			k) Extent of litter and vermin problems	2.5%	17
6. To minimise adverse effects on water quality	6.2%	7	l) Emissions contributing to eutrophication	1.3%	21
			m) Extent of water pollution	4.8%	9
Socio-economic Objectives	**Weighting**	**Ranking**	**Socio-economic Indicators**	**Weighting**	**Ranking**
7. To minimise local transport impacts (congestion, severance, fear and	7.2%	5	n) Total waste kilometres (by mode)	5.6%	7
			o) Transport along roads other than motorways	1.6%	20
8. To provide employment opportunities	2.9%	12	p) Number of jobs likely to be created	2.9%	13
9. To provide opportunities for public involvement and education	3.9%	10	q) Extent of opportunities for public involvement and education (concerning sustainable waste management practices)	3.9%	10
Operational Objectives	**Weighting**	**Ranking**	**Operational Indicators**	**Weighting**	**Ranking**
10. To minimise the increased costs of waste management	8.0%	4	r) Costs of collection, management and disposal, including material and energy revenues	8.0%	4
11. To ensure reliability of delivery	7.0%	6	s) Likelihood of implementation within required timescale, taking account of maturity of technology, necessary level of public participation, and the need for planning permission (taking account of scale of development and likely perceived	7.0%	5
Waste Management Policy Objectives	**Weighting**	**Ranking**	**Waste Management Policy Indicators**	**Weighting**	**Ranking**
12. To conform to waste policy	23.5%	1	t) Percentage landfill	11.2%	2
			u) Percentage recycled/composted	12.3%	1

TABLE A6.20: WEIGHTED 'VALUED PERFORMANCE' SCORES FOR OPTIONS 0 TO 6 (USING ISLE OF ANGLESEY AND NORTH WALES REGIONAL WASTE PLAN WEIGHTINGS)

	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Weighted Performance Scores (Isle of Anglesey Weightings)							
SWMO Assessment (all criteria)[2]	7	2	5	4	6	3	1
BPEO Assessment (BPEO criteria)[2]	7	3	6	4	5	2	1
Weighted Performance Scores (North Wales Weightings)							
SWMO Assessment (all criteria)[2]	7	2	5	3	6	4	1
BPEO Assessment (BPEO criteria)[2]	7	3	5	4	6	2	1

TABLE A6.21: OVERALL SCORES FOR OPTIONS 0 TO 6

	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Valued Performance Scores							
SWMO Assessment (all criteria)[1]	7	1	5	3	6	4	2
BPEO Assessment (BPEO criteria)[1]	7	3	6	4	5	2	1
Weighted Performance Scores							
SWMO Assessment (all criteria)[2]	7	2	5	4	6	3	1
BPEO Assessment (BPEO criteria)[2]	7	3	6	4	5	2	1
Weighted Performance Scores (Isle of Anglesey Weightings)							
SWMO Assessment (all criteria)[2]	7	2	5	4	6	3	1
BPEO Assessment (BPEO criteria)[2]	7	3	6	4	5	2	1
Weighted Performance Scores (North Wales Weightings)							
SWMO Assessment (all criteria)[2]	7	2	5	3	6	4	1
BPEO Assessment (BPEO criteria)[2]	7	3	5	4	6	2	1